

manufacturing

MAS TER PIE CES

 **GEOCLIMA**
Smart HVAC Solutions

THINK FORWARD



Geoclima International designs and produces special chillers for air conditioning and process applications, with a focus on **high efficiency** and **low environmental impact**. All our units are tailored to each client's specific requirements, pushing the boundaries of standard HVAC technology. **Where the others stop, we go on.**

TESTING AREA

The R&D division is constantly focused on developing **new solutions** to ensure continuous technological advancement of our units and optimize every single system component, delivering solutions specifically **tailored** to our clients' needs.

We produce **heat exchangers** in-house to maximize design flexibility and efficiency.

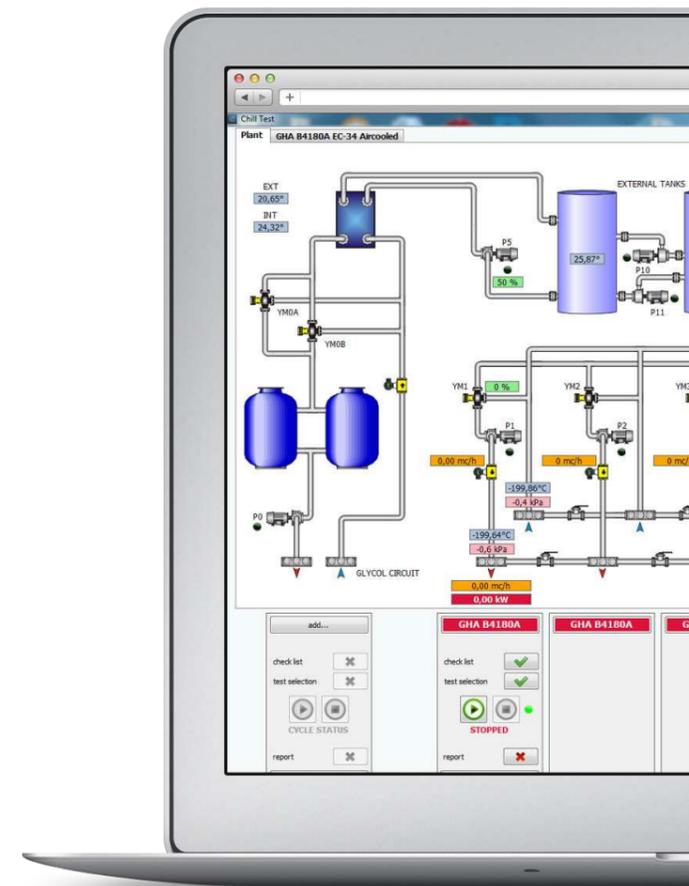
We have developed research programs with the **University of Padua** for the elaboration of advanced control algorithms.

Our production process is designed to be **highly flexible**, enabling the development of special units tailored to customers' specifications while adhering to the strictest quality procedures.

A key element of Geoclima's offering is our 312 m² **AHRI-certified** testing area, designed to simulate the actual environmental conditions of the installation site.

The test center features a **climatic chamber** capable of testing chillers under extreme ambient temperature conditions.

CONSTANT RESEARCH



QUALITY

From design to aftersale

Our **sales network** is present worldwide and includes authorized distributors that can count on highly qualified and well-trained maintenance teams.

We have exported our products in more than **50 countries** around the world, with detailed technical documentation available in multiple languages. Geoclimate's technical managers collaborate closely with clients to develop practical, energy-efficient, and cost-effective solutions for their unique projects, with continuous support from our R&D and technical departments.

Our **after sales service** offers full warranty support and is available directly through Geoclimate or one of our official partners across the world.

Each chiller is designed and manufactured within a **certified industrial system**, in accordance with the most stringent quality standards (UNI EN ISO 9001: 2015).

Geoclimate International has proudly earned the trusted AHRI-Certified® mark, an **assurance of the product's performance**, across its entire range of products as an Original Equipment Manufacturer.

AHRI-certification assures customers and end-users that Geoclimate chillers perform in strict accordance with the values declared in the technical documentation and **GeoSelectool** product selection software.

Geoclimate International chose AHRI certification over Eurovent due to its higher quality standards, offering several key advantages:

- AHRI certification applies to **all operating conditions**, ensuring that every data point generated by the system is certified.
- AHRI certifies air-cooled chillers up to **2110 kW** and water cooled-chillers up to **10551 kW**.
- AHRI imposes **stricter requirements**, covering testing methods, laboratory approval procedures, and overall compliance.
- AHRI standards are recognized **worldwide** and adapt to different climate zones.



Turbomiser from Geoclima is the most energy efficient chiller of its type on the market, reducing energy costs by up to 50% compared with traditional chillers. Thanks to its oil-free magnetic bearings, service and maintenance costs are dramatically reduced.

Turbomiser chillers have been designed and developed to optimise the **centrifugal magnetic levitation compressor Turbocor**, with both R134a and HFO-R1234ze. These compressors have proven to



have unprecedented quality, performance and durability. For 20 years, Geoclima has been actively cooperating in the development of these compressors and has been awarded as **Danfoss Turbocor Platinum Partner**.

Designed to reduce energy consumption, minimise or avoid leaks, reduce refrigerant charge, ensure reliable operation and deliver quiet running, Turbomiser has continuously evolved while maintaining its efficiency, using **the best components** available today on the market:

- **Inverter-controlled magnetic bearing compressors** whose output can be precisely matched to load;
- **Micro-channel aluminium condensers**,

ers, that reduce refrigerant charge while increasing the effectiveness of heat exchange;

- **Flooded evaporators** that ensure optimum heat transfer between refrigerant and water;
- **Inverter driven condenser fans** to match performance to demand and reduce energy consumption;
- **A sophisticated chiller control system** integrated with Turbocor onboard system.

New concept of Soft Start

The compressor requires less than 5 A for the start-up.

Compact and lightweight

The Turbocor compressor weighs ca. 130 kg and needs less than half the space of a compressor of the same capacity.

Extremely quiet

At full load operation, Turbocor compressor produces only 67 dBA.

Multiple Compressors

Chillers with more than one Turbocor compressor can benefit from great energy savings, as the Turbocor compressor provides incomparable energy efficiency at partial load conditions. An installation where the refrigeration load is split among different machines not only saves money, but also ensures the necessary redundancy.

TMA

Air-cooled chiller



Up to 2400 kW

TMA ES

Air-cooled chiller with Evaporative System



Up to 2500 kW

TMA FC

Air-cooled chiller with Free Cooling



Up to 2000 kW

TMA CM

Air-cooled chiller with cylindrical condensers



Up to 2500 kW

TMA CM FC

Air-cooled chiller with Evaporative System and cylindrical condensers



Up to 2200 kW

TMA ES FC

Air-cooled chiller with Evaporative System and Free Cooling



Up to 2500 kW

TMH

Water-cooled chiller



Up to 6000 kW

TMH MT

Medium temperature water-cooled chiller



Up to 1500 kW

TMH HP

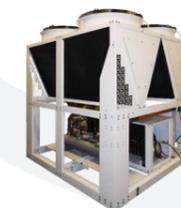
Water-cooled heat pump



Up to 1500 kW

TSA

Condensing unit



Up to 2400 kW

TSE

Condenserless water-chiller



Up to 2400 kW



G-Range by Geoclima is characterized by a simple structure, consisting of few moving parts, that leads to great reliability and to the reduction of vibrations and the related noise.

The **G-Range** includes all chillers with **screw compressors**, which are characterized by a **simple structure**: they are composed of few moving parts which enable a **continuous and fluid motion**. This leads to the decrease of the mechanical strains, **reducing this way the possibility of failure and wear**. The simplicity of the engineering ensures a sensible **reduction of the vibrations**, deriving from the mechanical motions, and of the related noise, with many benefits in terms of **comfort and installation**.



Thanks to the simple structure of the installed compressors, the **G-Range** units are characterized by **long-lasting life** and, therefore, by great reliability, as well as by a significant cut in maintenance costs.

G-Range supports R134a, HFO1234ze and R290 to allow our customers to choose between a high-efficiency solution or a more eco-friendly approach.

The line with **R134a** uses the most widely used refrigerant for more than fifteen years, after the prohibition of R22. The

proven international experience ensures a **deep knowledge** of the product qualities, as well as of its wide range of use (indeed, the R134a is used in both industrial and civil applications): this ensures a **high degree of reliability and efficiency**. After a comparison with other refrigerants, the **R134a turned out to be the best one considering efficiency and financial commitment, as well as installation and maintenance**.

On the other hand, the *greener* line uses refrigerants with a very low GWP (Global Warming Potential): **HFO-R1234ze** with GWP=6 and **R290** with GWP=3. Although this kind of systems have experienced relatively recent applications, the Geoclima R&D department has already tested **different uses** for these refrigerants, with the development of some units for this line of chillers. The main advantages in the use of these refrigerants concern not only the low environmental impact, but also the wide range of possible applications. Especially R290, besides being **completely natural**, turns out to be **particularly suitable for both positive and negative temperature applications**. With this eco-friendly line, Geoclima is also able to provide **innovative solutions**, aiming at efficiency and eco-sustainability as equally important purposes.



VRange



V-Range chillers are characterized by compact size and light weight, and, therefore, turn out to be particularly suitable for small plants, assuring great reliability and the reduced installation and management costs.

The **V-Range** includes all chillers with **scroll and reciprocating compressors**,



whose main feature is the guarantee of reliability and durability, with consequent advantages in terms of cut in management and maintenance costs. In addition to that, the **few vibrations** and the **very low noise levels** ensure that these chillers are used in industrial but also in civilian applications

(**comfort cooling**).

The great innovation introduced by Geoclima, especially as far as scroll compressors with R410A are concerned – but some applications have been studied also for reciprocating compressors with R290 – consists in the possibility of **combining several compressors in a single unit**. Indeed, if this kind of chiller usually has a very reduced capacity (from 3 to 50 kW), the **redundancy** enables the development of machine with higher capacity, even of hundreds kW. In thereby, the V-Range units are no more restricted to small-size

applications but, on the contrary, **can also be used for bigger plants.**

V-Range supports R410A, HFO1234ze and R290 to allow our customers to choose between a high-efficiency solution or a more eco-friendly approach.

The line with **R410A** uses a refrigerant that came into use to replace the R22. This refrigerant has been used for **more than a decade**: such experience ensures not only a deep knowledge of its qualities and wide range of use, but also great **reliability and efficiency**. Moreover, compared with other refrigerants, R410A provides **higher energy efficiency and lower energy consumption**.

On the other hand, the *greener* line uses refrigerants with a very low GWP (Global Warming Potential): **HFO-R1234ze** with GWP=& and **R290** with GWP=3. Although this kind of applications have only recently been developed, Geoclima has gained **valuable experience** – especially through the development of **the first World HFO chiller** – and can offer high efficiency and reliability. This version of **V-Range** chillers is designed to provide a real **combination of performance and eco-sustainability** of the entire application and to ensure **high security and reliability** in the use of HFO-R1234ze and, mainly, of propane.

VHA

Air-cooled chiller



⚡ Up to 1200 kW

VHA FC

Air-cooled chiller with Free Cooling



⚡ Up to 1100 kW

VHA CM

Modular air-cooled chiller with cylindrical condensers



⚡ Up to 230 kW

VHH

Water-cooled chiller



⚡ Up to 670 kW

VSE

Condenserless water chiller



⚡ Up to 610 kW

VSA

Condensing unit



⚡ Up to 1200 kW



- » Special dimensions
- » Low or very low noise levels
- » EE X construction for areas with risk of explosion
- » Low temperature chilled water/glycol down to -30 °C
- » Alternative supply voltages and frequencies (eg. 380 V / 60 Hz).
- » Structure and panels made of special materials
- » Special configuration for cold climates
- » Special configuration for hot climates
- » Hydraulic packs including pumps pressurisation units and expansion vessels
- » Special design for industrial and process applications
- » Special design for marine and sub-marine application

TAILOR-MADE

INNOVATION FOR THE ENVIRONMENT

Our priorities are eco-sustainability and environmental protection: different applications have been studied for HFO-R1234ze and R290 refrigerants, which are characterized by a very low GWP (Global Warming Potential).

The key advantages of these refrigerants lie in their low environmental impact and their versatility across a wide range of applications.

R290, in particular, is completely natural and particularly suited for both positive and negative temperature applications.

FLUID	GWP*	DISPLACEMENT	COOLING EER	HEATING COP
 R410A	2088	0.0657	3.038	4.038
 R134a	1300	0.14851	3.313	4.213
 R290	3	0.1113	3.250	4.250
 HFO 1234ze	< 1	0.19979	3.304	4.304

The table shows the difference of performance for each refrigerant at the same operating conditions:

Cycle = basic
 Evaporating T = 2 °C
 Outlet Superheat = 5 °C
 Condensing T = 48 °C
 Outlet Subcooling = 3 °C
 Pressure Drop = 30 kPa

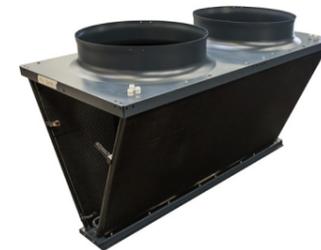
*For 100 years according to IPCC "Climate Change 2013".

SELECTED COMPONENTS



Free Cooling exchangers

Free cooling finned exchangers are installed upstream of the condenser coils. The greater the temperature difference between the circulating water and the outdoor air, the more efficiently the system operates. This solution is particularly suitable for data centers and process cooling applications, especially in mild to cold climates.



Air-cooled condensers

Micro-channel condensers are designed to deliver exceptional performance, compactness, light weight, and durability. Made entirely of aluminum, they are 60% lighter than traditional copper tube condensers and are fully recyclable. The micro-channel coil design minimizes air-side pressure drop, enabling the use of smaller, lower-power fans, which results in quieter operation. This technology improves heat exchange by up to 45% compared to traditional condensers made of copper tubes and aluminium fins.



Cylindrical condensers

Thanks to the special cylindrical configuration of these microchannel condensers, designed by our R&D Department, the heat exchange surface is increased by 45% compared to traditional condensers. By using the new Geoclima condenser coil and evaporator design, we have achieved performance improvements without changing the footprint of our air-cooled chiller range.



Flooded evaporators

Geoclima's flooded evaporators are designed to achieve the highest possible EER values. The minimal difference between refrigerant evaporating temperature and chilled water/glycol outlet temperature (i.e. 1-1.5 K) results in outstanding efficiency. The heat transfer process is highly effective, as the heat exchanger tubes are fully immersed in refrigerant. All Geoclima evaporators are PED-certified.



Shell and Tube exchangers

Geoclima shell and tube exchangers are designed using advanced technical solutions. The shell and tube is made of high performance tubes of special copper, finned externally and grooved internally for a low fouling factor. The condensers are specifically dimensioned to facilitate the connection with external cooling towers. Baffles are strategically positioned to ensure optimal flow rates compatible with potential pressure drops. Additionally, various baffle spacing options are available. The choice of the materials used in these evaporators is the result of the strict quality tests carried out in compliance with PED (Dir. 2014/68/UE) and the European norms regulating the construction of pressure vessels.



Electronic expansion valve

Geoclima has chosen to use expansion valves, as they guarantee a very precise control of superheat. This allows the evaporator to always be filled with the optimal amount of refrigerant, even with significant load variations. The current superheat value in the evaporator is continuously monitored by a pressure transducer and a highly sensitive temperature sensor, which transmit real-time data to the regulator. This results in low superheating, maximized evaporation pressure, and improvements in COP and energy efficiency.



Braze Plate exchangers

Braze Plate Heat Exchangers (BPHE) are composed of a stack of corrugated channel plates enclosed between front and rear cover-plate assemblies. These assemblies include sealing plates, blind rings, and cover plates. The advantages of this type of exchanger are:

- high efficiency and versatility;
- full performance at both full and partial load with low water/brine pressure drops;
- small dimensions and reduced weight;
- low temperature approaches resulting in high efficiency;
- minimum internal volume, meaning high coefficient of thermal exchange;
- low amount of refrigerant;
- high turbulence.



Switchboard

The switchboard is completely wired inside a watertight steel box IP54, produced according to the strictest European certification requirements. Power circuit is designed for the rated supply indicated in the datasheet, with fuse protection, contactors and thermal relays for each compressor. The control circuit includes all control devices. All switchboards are equipped with an IEC socket for service supply on the field. Moreover, the multi-compressor unit is provided with a thermostat-run ventilation and heating system.

Moreover, this type of exchanger is optimized to provide high performance both with R410A and low GWP refrigerants, such as HFO-R1234ze and R290.



Electronic control

All models are controlled by a unit with Flex Control microprocessor. When coupled to the safety devices on the machine or connected to it, the microprocessor enables compression insertion and automatically rotates the order of insertion. Programming and parameter setup are done directly on the display module, positioned outside the switchboard.



OPTION:

Opera Graphical Panel makes system monitoring extremely simpler and more intuitive than the older LCD. From the hardware point of view, the Graphical Panel has a touch screen of 7" or 10" and is able to offer excellent performance and low power consumption. The software is user-friendly and is able to collect and analyze the data provided by the system in order to optimize the operation of the chiller when connected to the system. According to this logic intelligent control, the chiller will always be brought to work at maximum efficiency.



EC fans

The key features of the EC fans used by Geoclima in air-cooled condensers are their compact design, low noise levels, and exceptional efficiency. The variable speed drive allows the fans to continuously adjust to load variations, ensuring maximum efficiency especially at partial loads. Energy savings of up to 30% can be achieved compared to conventional fans. With continuous operation, the cost of these high-efficiency fans is typically recovered within the first year.

EXCLU SIVE TECHNO LOGY



DNC is a **smart device** designed to **constantly measure the noise produced by the chiller and adapt the fan speed accordingly**, in order to not exceed the noise limits set for different time slots. The main difference between DNC and other systems consists in the fact that with the Dynamic Noise Control what must be set are only the noise limits, and not the performance levels: it is the DNC that regulates the fan speed, reducing its performance in order to fall within the highest permissible noise level.



ES is an **innovative dynamic** evaporative system which allows considerable energy savings, exploiting the natural process of adiabatic cooling. According to ambient conditions, the **smart control** distances the evaporative panels from the condensers to ensure a greater airflow and improve the efficiency. This way it's possible to reduce the air temperature by as much as 8 °C. It was found that employing the ES, Geoclima is able to **reduce the annual electrical absorption of the chiller by up to 30%**, in comparison to an equivalent conventional adiabatic system.



Geoselectool is a **chiller selection software**, developed by Geoclima together with the Department of Information Engineering of the University of Padua. Thanks to the Geoselectool, you can manage your own projects: you can plan the energy demand of the building, select the Geoclima unit that most suits a plant's specific requirements, simulate the annual energy consumption and define the financial plan for that specific plant.



The new and most efficient series of air cooled chillers present on the market, developed entirely in-house by our R&D department, is characterized by two important innovations:

- microchannel condensers with the **heat exchange surface increased by 45%** compared to traditional condensers, thanks to the special **cylindrical** configuration of the heat exchanger;
- **cascade flooded evaporators** which increase the evaporation temperature and, at the same time, reduce the energy consumption.

Thus, the new Circlemiser series provide incomparable performance and high efficiency levels, with an **increase in EER up to + 15%**, improving the already very high efficiency of the Turbomiser technology.



Onboard Touch is a web-based solution that makes it possible to **monitor the chiller operation and diagnose** any problems as soon as they arise. The user interface can be displayed on the **browser**, no software is therefore required and it can be run on both PC and mobile devices such as tablets and smartphones.



The new Circlemod series brings an innovative approach to the cooling systems world because it combines **energy efficiency, installation flexibility and attention to detail**, even from an aesthetic point of view.

The modular design allows to configure **up to 8 units** with a single group control. Each module has a high cooling capacity (up to 150 kW) compared to the ground footprint. This means that **in a limited space you can have remarkable performances**.



APPLICATIONS

Hospitals

Ensuring a stable and reliable environment for hospitals is vital for patient and staff safety and comfort, and for ensuring that delicate treatment and monitoring systems function as intended. The stability of environments in critical facilities such as operating theatres is crucial. This requires the use of proven and reliable cooling equipment, customised to ensure it delivers the precise conditions required in a given application, and supported with 100% back-up. The fine control offered by Geoclima chiller ensures the indoor hospital environment is maintained within predefined temperature and humidity limits, and that there is no magnetic interference from VSDs that could affect sensitive hospital equipment. With EMF and EMI filters fitted as standard, Geoclima achieves all of these requirements with its state-of-the-art controls.

Plastic Industry

In this highly competitive market, a key challenge facing plastics manufacturers is to deliver the most efficient and cost-effective product to the market place at all times. This means optimising production processes – and cooling is a vital component in this. Our innovative chillers enable plastics producers to significantly reduce their manufacturing costs by halving power consumption for cooling. This gives a valuable market advantage to plastics processors, as they can use the lower production costs to improve their profit margin or increase their competitiveness in the market to win more work.

Pharmaceutical Industry

Control of space temperature and humidity is vitally important in this industry. Clean rooms in particular must be designed with utmost care

and have to be cooled reliably and efficiently. Our chillers are the perfect solution with their variable speed oil-free magnetic bearing compressors, total immersion evaporators, micro-channel condenser coils and over-arching intelligent controls. It is clean technology perfectly designed for the Pharmaceuticals industry.

Food & Beverage

Production of food and drink requires reliable and efficient cooling especially in this day and age when the security and quality of the finished product are paramount. Our chillers provide a steady supply of chilled water or glycol at design temperatures +/- 0.5 °C to cool the food and beverage process equipment. Our units with oil-free compressor have the advantage that they do not require potentially expensive oil and filter changes and there are no oil pumps or heaters to worry about. It is a clean technology perfectly designed for the food and drinks industry.

Car Manufacturing Industry

Paint shops, wind testing tunnels and environmental test chambers all require cooling of one type or another. Geoclima chillers can be effectively applied no matter what type of cooling system is required, be it air cooled, water cooled, remote air cooled etc. There is also the possibility of heat recovery to further increase energy savings and reduce the carbon footprint of the factory.

Power Stations

We have run trials under maximum and part load conditions, including simulations of unusual operating scenarios. It has been demonstrated that our chillers ensure essential benefits, in terms of energy efficiency and absence of interference of operations, that are preconditions in

in large-scale power station projects.

Commercial Buildings

Minimal running costs and extremely low start-up current are just two reasons that favour using Geoclima units in commercial buildings. In the case of comfort cooling, our units ensure high level energy efficiency ratio (EER) and with control optimisation of the condenser fans, energy savings up to 50% can be achieved. Large commercial buildings in built up areas are often penalised by stringent maximum load tariffs, and it is often the chiller plant that causes the maximum limit to be reached resulting in high cost penalties for the owner/occupier. A conventional compressor on a chiller plant can have a peak starting current of 600 A or more, whereas a Turbomiser compressor, for example, has a starting current of only 5 A reducing the risk of hitting the maximum demand meter dramatically.

Data Centres

Data Centres use a lot of power to cool their servers and support equipment and owner/operators are constantly looking at ways to reduce power and improve reliability. Chillers are used extensively on data centres and there are usually one or more backup chillers to minimise the risk of the data centre shutting down due to overheating. Our units are the ideal solution because they are reliable and efficient and do not require as much maintenance. Because data centres have a steady heat load 365 days per year, energy and carbon savings achievable using our chillers are dramatic! In many cases, 50% energy savings can be easily achieved when Geoclima chillers are installed.



IMPORTANT PROJECTS



Canary Wharf - UK

15 MW cooling capacity project, we designed and developed chillers, heat pumps and AHUs together with ClimaTech.



Oil and Gas company - Italy

Two 1200 kW GHH water cooled chillers with 2400 kW of total cooling capacity. The units provide 5.43 EER and 7.26 ESEER.



Colt Data Centre - UK

Six 550 kW Turbomiser air-cooled chillers. The system made it possible to obtain an energy saving of 54% and a reduction of £ 230,000 in annual costs.



Melbourne Ice Rink - Australia

For this 770 kW water-cooled chiller with screw compressor, Geoclima R&D developed a special evaporator, able to operate in two different modes - ice-making and dehumidification.



City of Westminster - UK

Two 900 kW air cooled Turbomiser chillers, providing 1.8 MW of total cooling capacity and assuring a very low noise limit of 51 dBA at 10 m.



Sports Club - Hong Kong

Two TMA with 900 kW of cooling capacity each and 50% heat recovery, providing both cooling and heating to an area of 17,400 sqm.



Food&beverage - Spain

Two 300 kW GHA units with HFO-1234ze for a total power of 600 kW and a maximum Cooling COP of 2.4/2.6 (W/W).



Dart Mega Data Center - UK

12 air cooled chillers TMA 1.4 MW each for a unique project, developed from specific requirements, saving over 554 tons of CO₂.



Unison Laboratories - Thailand

2 air-cooled Circlemisers for a total 844 kW and an EER of 3.6 W/W. The system guarantees high efficiency and an excellent return on investment. This is the first installation in Thailand of Circlemiser chillers.



Ullsteinhaus - Berlin

A 330 kW knocked-down Circlemiser with HFO-1234ze (EER 3.79 W/W). The unit was split into two sections to allow for a small crane. The various parts were then reassembled on the roof.

Geoclimate Group

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